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ABSTRACT

To judge the feasibility of establishing government-supported day secondary schools in rural areas, researchers in Uganda tested whether a school attendance area delineated by a circle of five kilometers' radius from the school would provide sufficient numbers of students. At present the Ugandan government supports only secondary boarding schools, but boarding schools are expensive and tend to isolate students from rural life. Data for the feasibility study were gathered through a questionnaire and interview survey of 410 secondary students in two rural private day schools in Busoga District. Analysis of data on students' current residences, sex, and methods of travel to school and on the locations of their fathers' homes and of their primary schools yielded several important findings. First, many students came from beyond a five-kilometer distance; second, most of these students either rented rooms near the school, lived with relatives, or traveled by bicycle. Since not enough students live within a five-kilometer distance to make day secondary schools feasible, the author concludes that government funding of bicycles for students living more than five kilometers away, as opposed to bus transportation, would best solve the problem. (Author/RW)

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DETERMINING THE FEASIBILITY
OF GOVERNMENT-AIDED DAY
SECONDARY SCHOOLS IN RURAL
UGANDA

Richard Marvin

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I. INTRODUCTION

1. Day schools versus boarding schools

In Uganda, as in many countries of sub-Saharan Africa, the boarding school is the standard instrument through which the government provides educational opportunities at the secondary level for the rural population. Whereas primary schools are widely dispersed throughout the countryside, making it possible for most youngsters to live at home during their first seven years at school, Uganda has at present only 73 government-aided secondary schools to serve a land area of 193, 503 square kilometers. A strict selection process occurs at the close of the primary school course and on the basis of a nationwide examination the best ten per cent of those enrolled in class seven receive the opportunity to continue their studies at a government-aided secondary school.(1) Because of the relatively small number of youngsters which can be provided for by the government at the secondary level, current practice is to concentrate these pupils at boarding institutions, with day schools operating normally only in the largest cities.

Given the vast land area which has to be served by a limited number of secondary institutions, there would appear to be good reason for the present system of boarding schools. However, there are disadvantages associated with such schools and there can be little doubt that the possibility of shifting emphasis to a day school system will be a central issue in any discussion regarding the future expansion of secondary facilities.

A complete listing of all the arguments in favor of and against a boarding school education is outside the scope of the present study; however, two of the most significant disadvantages may be mentioned. First, boarding schools are expensive. If the money used to build and maintain boarding institutions was instead used to provide places in day schools, the capacity of the educational system could be greatly increased.

(1) In addition to the children who continue their education at the academic secondary schools, approximately one per cent enter career oriented courses at government operated rural trade schools or teacher training institutions.

The second disadvantage of boarding schools is that they isolate young people from the rural society. As Esekamwa and Lugumba comment regarding this characteristic of Ugandan secondary institutions,

"In most cases, schools have rules which restrict contact of their students with the community around, let alone the fact that many such schools are enclosed by wire fences with guarded iron gates." (1)

Because of the lack of communication between the pupils and the rural villages it would seem that the boarding school is in a less favorable position than the day school to accomplish what is presumably one of its chief long term goals, namely, that the effort spent on educating young people should contribute to the well being of the rural population as a whole.

Certainly it is true that situations such as a slow pace of rural economic development or a high rate of rural-to-urban migration among school leavers must in the first instance be explained by factors other than the type of formal education available in a given region. Nevertheless, it seems appropriate to comment on the reasons why an educational system based on boarding schools is in an extremely poor position to provide a basis for improving the lot of the rural population.

The isolation which occurs at boarding schools has an impact both (a) while pupils are attending school and (b) after they have completed their education. The immediate effect of operating schools as boarding institutions is to curtail the feedback from the school to a pupil's family and home village. For example, a schoolboy may be in an excellent position to offer advice as to whether it would be more profitable for his family to grow and market a food crop instead of a traditional cash crop such as cotton. Yet if the son seldom visits home the family may never hear his views on the subject. A girl may well have learned in health science classes that modern packaged infant foods are in rural areas an inferior substitute for breast feeding because of the difficulty of assuring sterile preparation. But how much opportunity does the girl have to share this information with her mother or sisters if she is living at a boarding school?

(1) J. C. Esekamwa and S. M. E. Lugumba, Educational Development and Administration in Uganda 1900-1970, Kampala, Longman Uganda, 1973, pg. 80.

Regarding the situation which exists after a pupil completes his education, two points may be mentioned. In the first place, a pupil who attended a boarding school will have had little opportunity to see how the subjects taught at school are relevant to the daily life of the village; illustrations given by teachers and textbooks are a poor substitute for personal experience. Secondly, by the time he leaves school a pupil will have become accustomed to a way of life which does not exist in rural villages. For four years he will have lived with running water, electricity, and the constant companionship of others with an equally high standard of education. Unlike the day school pupil, he will have had little chance to balance the school experience against the experience of a very different kind of life in his home village.

Having had few chances to see how the knowledge gained at school might be related to life in the village and having become accustomed to a way of life which does not exist in the village, it is not surprising if the pupil who has studied at a boarding school is less oriented to living and working in rural areas than is the pupil who has attended a day school. As one day school pupil commented about those who finish their education at boarding schools:

"When they go back to the villages it is where they find difficulties to do all the activities as a villager."(1)

2. The research problem

Because boarding schools are expensive and at the same time limited in their ability to contribute to overall progress in rural areas, we may assume that the day secondary school will be an increasingly significant policy alternative. Yet regardless of how desirable a day school system may seem, it will have little chance of support if officials fear that pupils are too widely scattered to make such a system practical. Thus, a critical question about which information is required is what the concentration of government supported pupils must be in order for a system of day schools to be workable.

One study which attempts to answer this question is that made by Gould for western Uganda. In arriving at the conclusion that by 1979 the density of pupils at the secondary level will be sufficient to justify day

(1) Statement by a Musoga pupil, 13 June 1973.

schools - but only if buses are used to transport pupils to and from school - Gould focuses on two factors which are fundamental in determining whether one can assume that at a given location the supply of pupils will be adequate. These factors are: (1) the number of potential pupils per unit area; (2) the size of a school's catchment area.(1)

In discussing the number of pupils to be expected in an area of a given size Gould introduces the formula: $P = T \times E \times A$,

where P = number of pupils;
 T = total population;
 E = enrolment ratio;
 A = percentage of T in age group.(2)

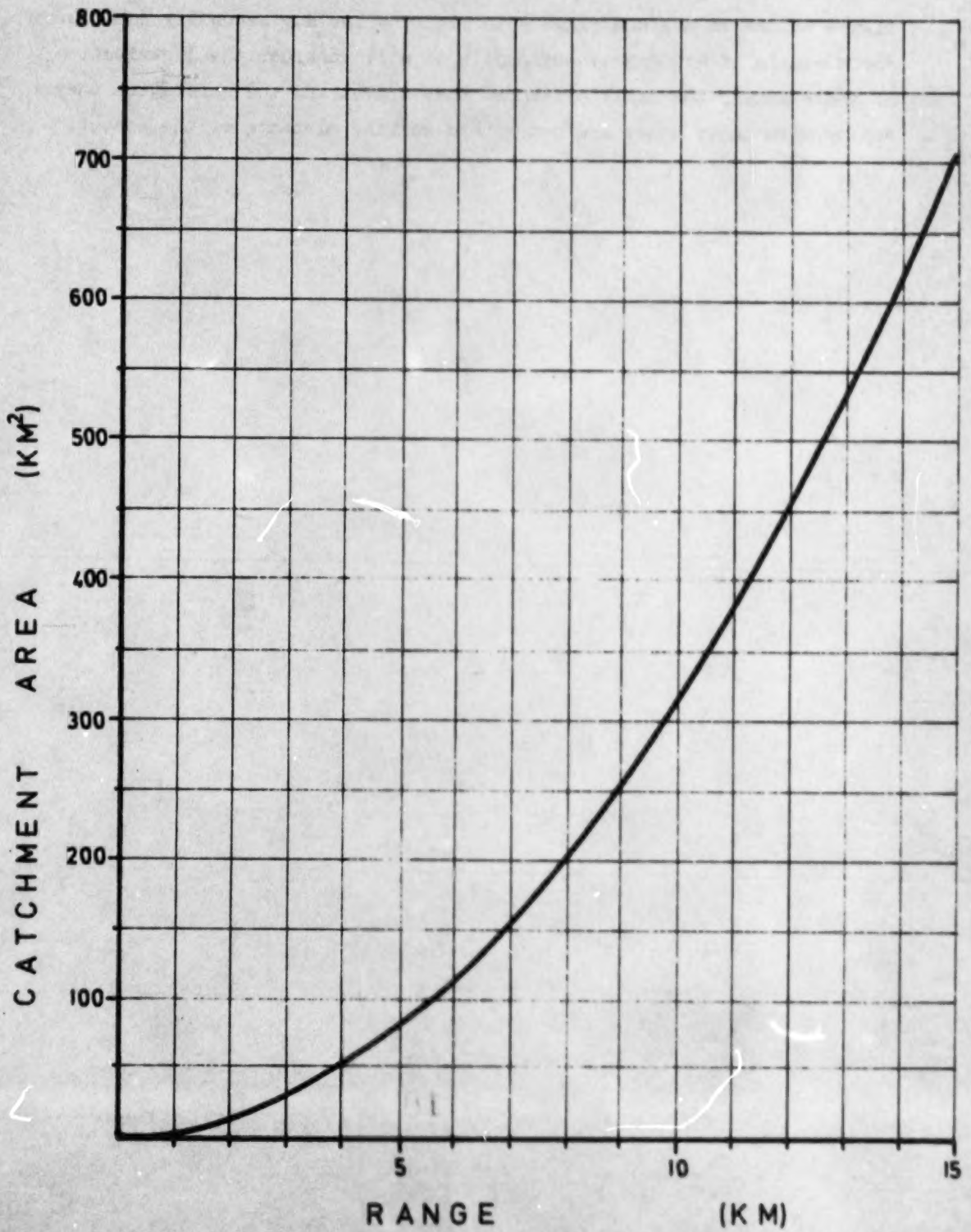
The procedure then is to show how figures for each of the independent variables can be obtained from census data and Ministry of Education statistics. Finally, a discussion occurs as to how increasing population density may be taken into account in order to obtain projections for the situation to be expected in the year 1979. In short, when calculating the number of potential pupils per unit area, Gould makes every effort to employ specific data from the district which he is studying.

The second factor which determines the supply of pupils at a particular location is the size of a school's catchment area. In discussing this factor, Gould assumes that if no buses are available the maximum range from which pupils will come to a school is five kilometers. Here, however, a difficulty exists because no empirical evidence is given to support the range figure which is suggested. The question arises as to whether five kilometers is actually the best possible estimate of the maximum distance a Ugandan secondary school pupil can be expected to travel, or whether another figure might be more appropriate. This matter is of considerable importance to the planner since the range variable is a particularly crucial one: the area served by a school (and hence the number of pupils attending) varies exponentially with the figure used for maximum range (see Figure 1). Thus, an increase in the range variable from five to seven kilometers would double the number of pupils to be expected at a school.

(1) W. T. S. Gould, Planning the Location of Schools: Ankole District, Uganda, Paris, Unesco: IIEP, 1973, pp. 75-77.

(2) Ibid., p. 76.

Figure 1. Relationship between range and catchment area.



This study will evaluate whether five kilometers is a reasonable figure to use as maximum range when planning for day secondary schools. For a sample of 410 day school pupils we will consider the distribution of their homes, the daily distances they travel and the strategies they employ when their homes are not within walking distance of the school.

II. RESEARCH PROCEDURE

The chief source of information is a questionnaire which was administered early in 1974 in two private day schools in Busoga District in Uganda. Data from the pretest a year earlier is also included for some questions. Finally, at one of the schools the pupils in three classes were interviewed with the aid of detailed maps in order to obtain more accurate information in regard to place of residence than could be obtained on a written questionnaire. (1)

A note on school location is important for understanding the discussion which follows. Both schools are situated away from the major centers of industry and government and serve above all the rural population. However, there is one difference. The first school is located at a rural trading center - a handful of small shops, with several primary schools and some offices for local administrators nearby. The second school is in a much larger community, which we will call a town. In addition to the administrative and educational institutions being more extensive than those of the trading center, the town has a far greater number of shops as well as specialized facilities such as a petrol station and a police post.

(1) The use of three instruments, which sometimes elicited the same information and in other cases did not, resulted in variations in sample size from question to question.

III. AREA SERVED BY PRIVATE DAY SCHOOLS

1. The home villages of the pupils

There are various methods of defining the area which benefits from the services of a school. The most straightforward approach is to register for each pupil his home village and then determine over how wide an area these villages are distributed. Since it is difficult to construct a single measure of place of residence which would be unambiguous for all pupils, (1) the present study included two separate questions. Each pupil was asked to state first his father's home village and second the location of the primary school he had attended.

The chief difficulty associated with the first method of questioning is that a man may have more than one home, making it difficult for his children to state with certainty where the family's home is located. That such quandaries do arise is well illustrated by the case of a brother and sister in the present study. Both were living with their father at the village to which he had moved in order to accept employment. The father, however, continued to maintain his permanent home in another county, and when asked to state the location of the father's home, the boy reported the home as being at the father's place of employment while his sister named the permanent home.

For the alternative measure of home area - primary school location - it is normally possible to obtain reliable information from pupils. However, new sources of error may be introduced by using this method. For example, if the school in his home area is overcrowded or perceived to be of poor quality a pupil may have lived with relatives away from home for the specific purpose of attending primary school. Thus, if only this method of determining a pupil's home area is used, there is a possibility that regions with less well developed educational facilities may appear to be less important as sources of secondary school pupils than they in actual fact are.

To attempt to calculate figures on home-school distance using the exact location of every pupil's home village would be a tedious process. An alternative method of analysing the distribution of pupils' homes

(1) Gould, op. cit., pp. 60-61.

which is relatively easy but at the same time adequate for many purposes is to classify each boy and girl according to the county and district in which his or her home is located. Table 1 divides pupils according to whether the father's home is:

- (a) in the same county as the school (hereinafter "school-county");
- (b) in one of the four counties nearest to the school-county;
- (c) outside the core area of five counties already mentioned under (a) and (b) but still inside Busoga; or
- (d) outside Busoga.

One might expect that a day school would cater almost exclusively to pupils residing in the same county as the school itself is located. But on the contrary, the results in Table 1 show that both schools in the present study are serving a considerable area. At the town school only 39.5 per cent of the boys and 54.5 per cent of the girls come from homes which are within the school-county. The homes of all other pupils are located outside the school-county and thus at least seven kilometers from the school. The trading center school appears to be more locally oriented than the town school, but even here, where 65.0 per cent of the boys and 71.2 per cent of the girls come from within the school-county, services are definitely not restricted to the immediate vicinity of the school.(1)

When the alternative measure of a pupil's home area is used, i.e. the place where he attended primary school, the distribution by counties is approximately the same (see Appendix). An additional observation which can be made from the tabulations by home county in Table 1 and the Appendix is that the percentage of girls coming from homes within the school-county is greater than is the percentage of boys, especially at the town school. Explanations for the fact that girls are less likely than boys to come from homes which are far from the secondary school they attend will be discussed in Section IV. First, however, we must ask whether we are satisfied with the method of listing pupils' homes which has been developed so far.

(1) Although the day schools do serve vast areas, there are limits beyond which the number of pupils they are capable of attracting declines sharply. Neither school enrolls more than one or two pupils of each sex from outside Busoga and the number coming from remote counties within Busoga is considerably smaller than those coming from nearby counties.

Table 1. Place of residence of pupils' fathers (%)

	School-County	4 Nearby Counties	Other Busoga	Non-Busoga
<u>Trading Center School, Boys (N=137)</u>				
Column	-	a. (5 km): 8.8	-	-
Subdivisions		b. (8 km): 11.7		
		c. (12 km): 4.4		
		d. (13 km): 1.5		
Total	65.0	26.4	8.0	0.7
<u>Trading Center School, Girls (N=73)</u>				
Column	-	a. (5 km): 11.0	-	-
Subdivisions		b. (8 km): 8.2		
		c. (12 km): 4.1		
		d. (13 km): 1.4		
Total	71.2	24.7	2.7	1.4
<u>Town School, Boys (N=142)</u>				
Column	-	a. (7 km): 16.9	-	-
Subdivisions		b. (7 km): 10.6		
		c. (8 km): 8.5		
		d. (9 km): 6.3		
Total	39.4	42.3	16.2	2.1
<u>Town School, Girls (N=55)</u>				
Column	-	a. (7 km): 9.1	-	-
Subdivisions		b. (7 km): 7.3		
		c. (8 km): 7.3		
		d. (9 km): 5.5		
Total	54.5	29.2	10.9	5.5

Note: The distance in parentheses indicate the number of kilometers between the school and the nearest boundary of a given county.

Although the tabulation by counties gives an adequate indication of whether or not a school's services are restricted to a small area, it provides no exact information regarding the pupil who lives within the county in which the school is located. For example, a pupil attending the trading center school and recorded as having his home within the school-county may live anywhere from zero to twenty kilometers from the school. Since approximately half of all the pupils questioned had homes in their respective school-counties, it would be desirable to have a more precise indication of how far from the school the homes of these pupils are located. For this purpose a map has been made showing the distribution of the home areas of the trading center school pupils.

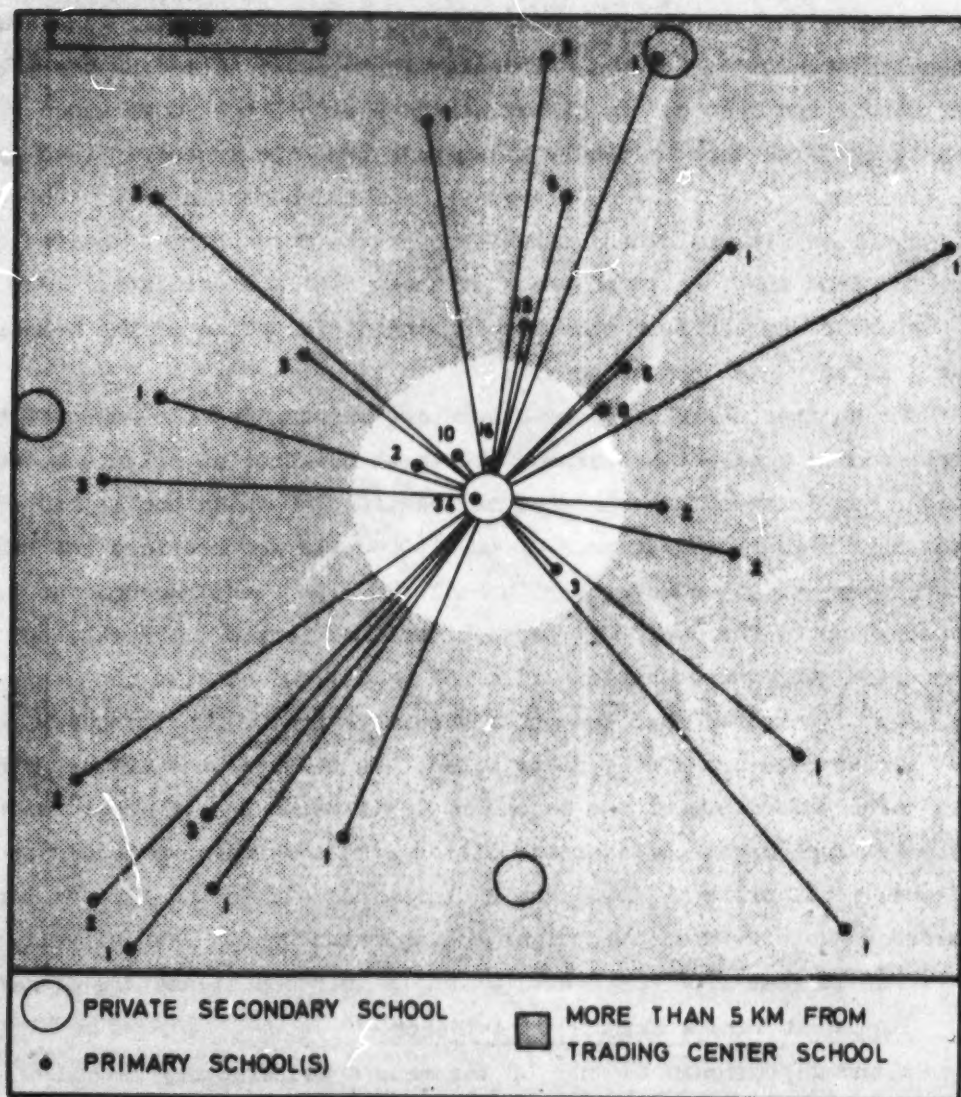
For an area of 1225 square kilometers surrounding the school (the smallest square area which includes the three neighboring private secondary schools), Map 1 shows the twenty-eight locations at which pupils had received their primary education. Of the 169 pupils who provided information on where they had attended primary school, 76.3 per cent had done so within the area shown by the map, 20.7 per cent at locations off the map, and for 3.0 per cent the exact location could not be determined with certainty.

Map 1 indicates that the primary schools from which secondary school pupils come are widely distributed. To be sure, the primary schools within three kilometers of the secondary institution are of great importance. Yet schools at considerable distance do provide more than just an occasional pupil or two. For example, three schools in the five to ten kilometer range provided five, eight and thirteen pupils respectively, and six pupils came from one school which is thirteen kilometers distant.

2. Permanent versus temporary residence

Although, through the use of the map, a satisfactory method of representing pupils' homes has been achieved, one control variable must be introduced before proceeding with the discussion of the size of the area which can be served by a day secondary school. In actual fact, many pupils at the two schools surveyed do not commute daily from their permanent homes. Rather, what frequently occurs is that pupils seek a temporary residence near the secondary school while classes are in session. Since it thus appears that the homes of some pupils are too far from the school to permit attendance on a daily basis, it is in some respects misleading to include these pupils when discussing the area which is

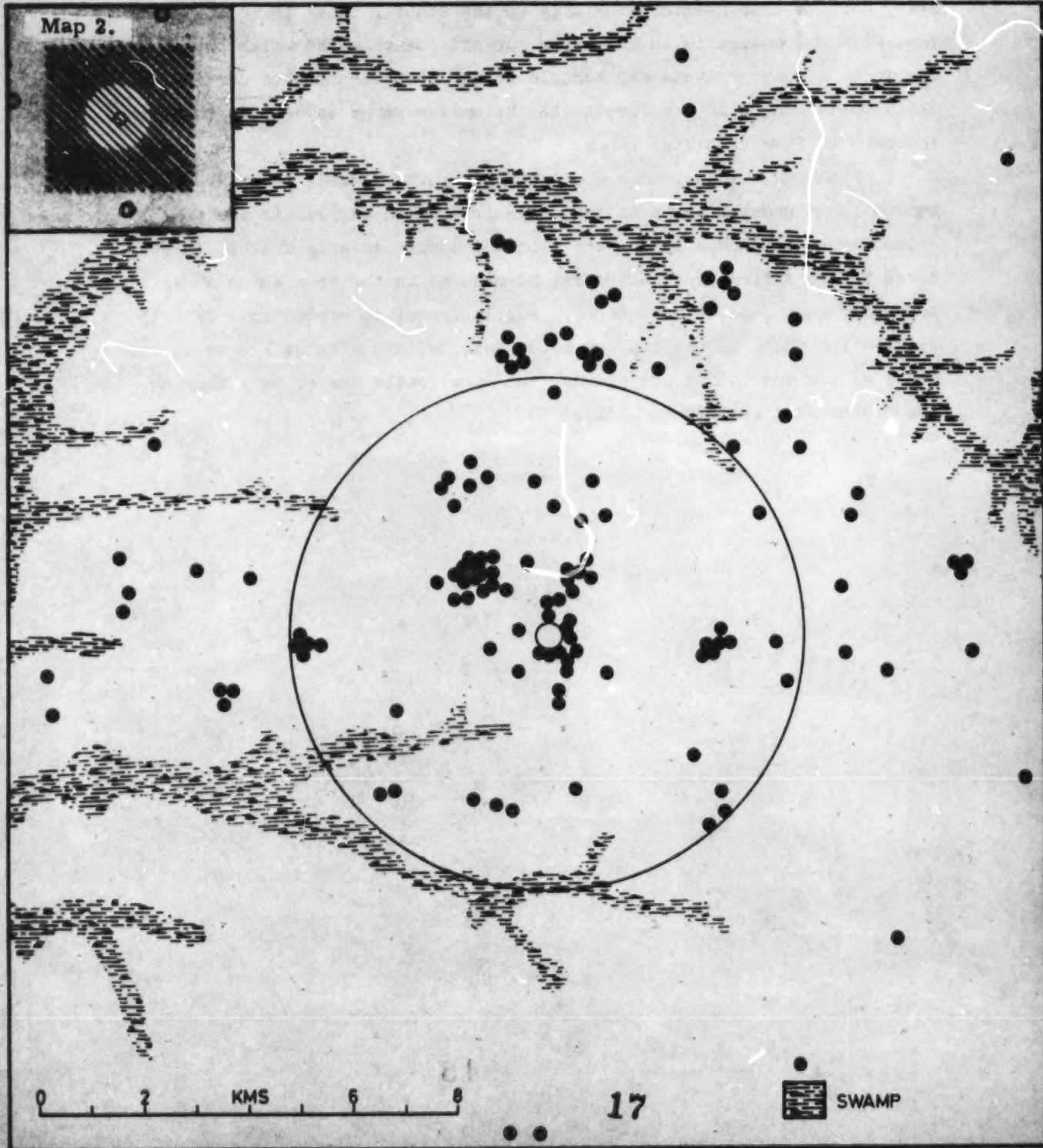
Map 1. Number of trading centre school pupils who received primary education at specific locations.



"served" by the school. An alternative and perhaps more valid description of this area is obtained if we exclude for the moment pupils who find temporary term-time residence near the school and consider only those pupils who always reside at their permanent homes, travelling daily from there to the school.

For 135 pupils at the trading center school who do not seek temporary residence away from home, Map 2 indicates the distribution of the homes of the fathers. Compared with the previously discussed distribution

Map 2. Homes of trading centre school pupils. Pupils who have moved to temporary accomodations near the school are not included.



of the homes of the entire school population, the homes of the pupils in this subsample are more concentrated in the vicinity of the school. However, despite this greater proximity to the school, there is no indication that five kilometers is in any way a cut-off point beyond which pupils are unable to attend; private day schools appear to be capable of serving on a daily basis pupils in the five to ten kilometer range as well as those in the zero to five kilometer range.

Although this evidence does indicate quite clearly that five kilometers is an underestimate of the range from which day pupils are able to attend secondary schools, one additional control variable must be introduced before a final conclusion may be made as to the area which a day secondary school is able to serve. Pupils travel to school in a variety of ways (on foot, by bicycle, by motor vehicle) and without a control for means of transportation the planner can make little use of data showing the distances travelled each day.

IV. METHODS OF COPING WITH THE HOME-SCHOOL DISTANCE PROBLEM

In the previous section, tables and maps were presented which illustrate that the services of private day secondary schools are by no means restricted to the immediate vicinity of the schools. Although this information is of considerable interest, it does not in itself give an answer as to when the demographic preconditions for a government system of day schools are met: just as tables or maps indicating a pupil's permanent home must include information about the frequency with which boys and girls seek alternative places of residence while attending secondary school, maps showing where pupils actually do reside when school is in session need to be supplemented with data concerning the means of travel utilized in the daily journey. Only after considering all the strategies which day school pupils currently employ and then determining whether or not these will be available within a government system, is it possible to make reliable statements about the feasibility of government-aided day schools.

When pupils and parents are faced with the difficulty of attendance at a secondary school which is not within easy reach of the family home there are several courses of action open to them. The three chief methods of coping with the situation are:

- (1) temporary residence with relatives;
- (2) the rental of accomodation near the school;
- (3) long daily journeys to school, in many cases by means other than on foot.

Nearly half of the pupils have moved to temporary housing in order to be closer to the school they are attending. A place of residence other than the father's home is reported by 48.0 per cent of the pupils. Although in some cases a pupil may be living permanently with a relative other than his father for reasons which have nothing to do with the distance between the father's home and the school, if a control for distance is introduced it is possible to obtain an indication that most pupils not residing with their fathers have left home specifically for the purpose of attending school. Table 2 shows that it is largely pupils who live far from school who do not reside with their fathers. Of the pupils whose fathers reside outside the school-county, 88.1 per cent of the boys and

Table 2. Pupil's place of residence by location of father's home (%)

	Location of Father's Home	
	School-County	Elsewhere
<u>Boys</u>		
Living with father	88.3	11.9
Not living with father	11.7	88.1
Total	100.0 (N=145)	100.0 (N=134)
<u>Girls</u>		
Living with father	85.2	8.5
Not living with father	14.8	91.5
Total	100.0 (N=81)	100.0 (N=47)

91.5 per cent of the girls are not living at their fathers' homes. By contrast, when the father's village is within the school-county only 11.7 per cent of the boys and 14.8 per cent of the girls live away from home.

For the sample as a whole, residence with a relative is the most frequent means by which pupils obtain accommodation near the school (see Table 3). Of the pupils who are coping with the distance problem in this way, 38.8 per cent are living with grandparents, 32.0 per cent with a brother or sister of their father and 29.1 per cent with other relatives. (1)

The rental of accommodation is the second method of overcoming the distance barrier. This strategy, however, is primarily employed by boys. Among the girls who are not living at home, only 8.3 per cent and 12.9 per cent from the trading center and town school respectively are renting accommodation whereas the corresponding percentages for the boys are 27.0 and 49.4. The fact that girls seldom reside in rented accommodations is with certainty due to the unwillingness of parents to allow their daughters to live without adult supervision.

(1) In calculating the percentages one pupil who reported living with both his grandmother and his father's brother was included in the latter category.

Table 3. Type of residence of pupils not living at fathers' home (%)

	Trading Center School		Town School	
	Boys	Girls	Boys	Girls
With relatives	58.3	87.5	38.8	71.0
Renting	27.1	8.3	49.4	12.9
Other	14.6	4.2	11.8	16.1
Total	100.0	100.0	100.0	100.0
	(N=48)	(N=24)	(N=85)	(N=31)

In addition to the influence which a pupil's sex has on the strategy he employs, Table 3 also shows that, for boys, there is a difference depending on which school is attended. At the trading center school twice as many boys live with relatives as rent accommodation whereas at the town school it is the rental of accommodation which is the more common strategy. Part of the explanation for the high incidence of renting at the town school is no doubt the fact that the community contains many more buildings and hence greater possibilities for renting exist. Also, as we have indicated earlier (Table 1), the town school attracts more of its pupils from outside the school-county (perhaps because of being more widely known). Since pupils who come from far are less likely to have relatives near the school, they will be forced to rent housing.

In addition to the possibility of obtaining accommodation either by paying rent or by staying with relatives, a third strategy for a pupil is to arrange with a house owner that instead of cash, some form of service will be provided in return for the accommodation received. For example, a pupil may assist in carrying the water for the home from the well. Solutions not involving the payment of cash rent are probably most frequent when the pupil (or his family) and the house owner are acquainted beforehand; such arrangements are normally the basis upon which teachers make space in their homes available to pupils.

If a pupil does not move to a temporary residence near the school, then the strategy which usually follows when his family lives far from the school is to discover some way of making the daily journey by means other than on foot. As indicated in Table 4, of the pupils who live at their

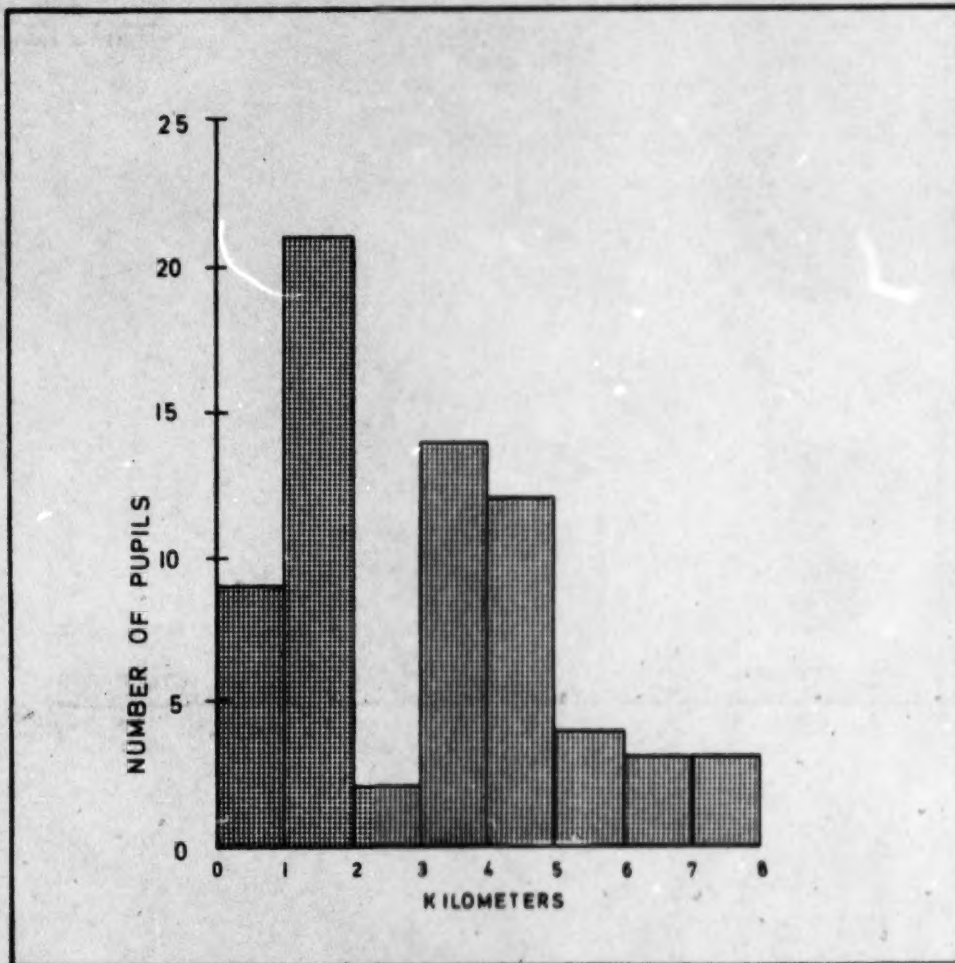
Table 4. Means of travel to and from school by place of residence (%)

	Pupil's Place of Residence	
	At Father's Home	Not at Father's Home
<u>Boys</u>		
On foot	47.1	86.0
By bicycle	49.6	14.0
Back of bicycle	0.0	0.0
Other	3.3	0.0
Total	100.0 (N=121)	100.0 (N=93)
<u>Girls</u>		
On foot	80.3	89.7
By bicycle	4.9	5.1
Back of bicycle	3.3	2.6
Other	11.5	2.6
Total	100.0 (N=61)	100.0 (N=39)

fathers' homes, over fifty per cent of the boys and nearly twenty per cent of the girls travel to school by means other than on foot. The most important alternative method of travel is by far the bicycle. Of the boys living at their fathers' homes, 49.6 per cent make the daily journey by bicycle.

Meanwhile girls, it should be noted, do not normally ride bicycles to school. Models especially manufactured for women are rare, and since girls do not wear trousers they find it difficult to operate men's bicycles. Being unable to ride bicycles, girls employ more frequently than do boys alternative methods to aid them in their travel, namely, riding in a car or bus or being carried on the back of a bicycle or motor scooter. Of the girls living at their fathers' homes, 14.8 per cent travel by such means; the comparable figure for boys is 3.3 per cent. Of the fifteen pupils reporting that they do not travel on foot or on a bicycle which they themselves operate, seven reach school by car, three travel by bus, three are

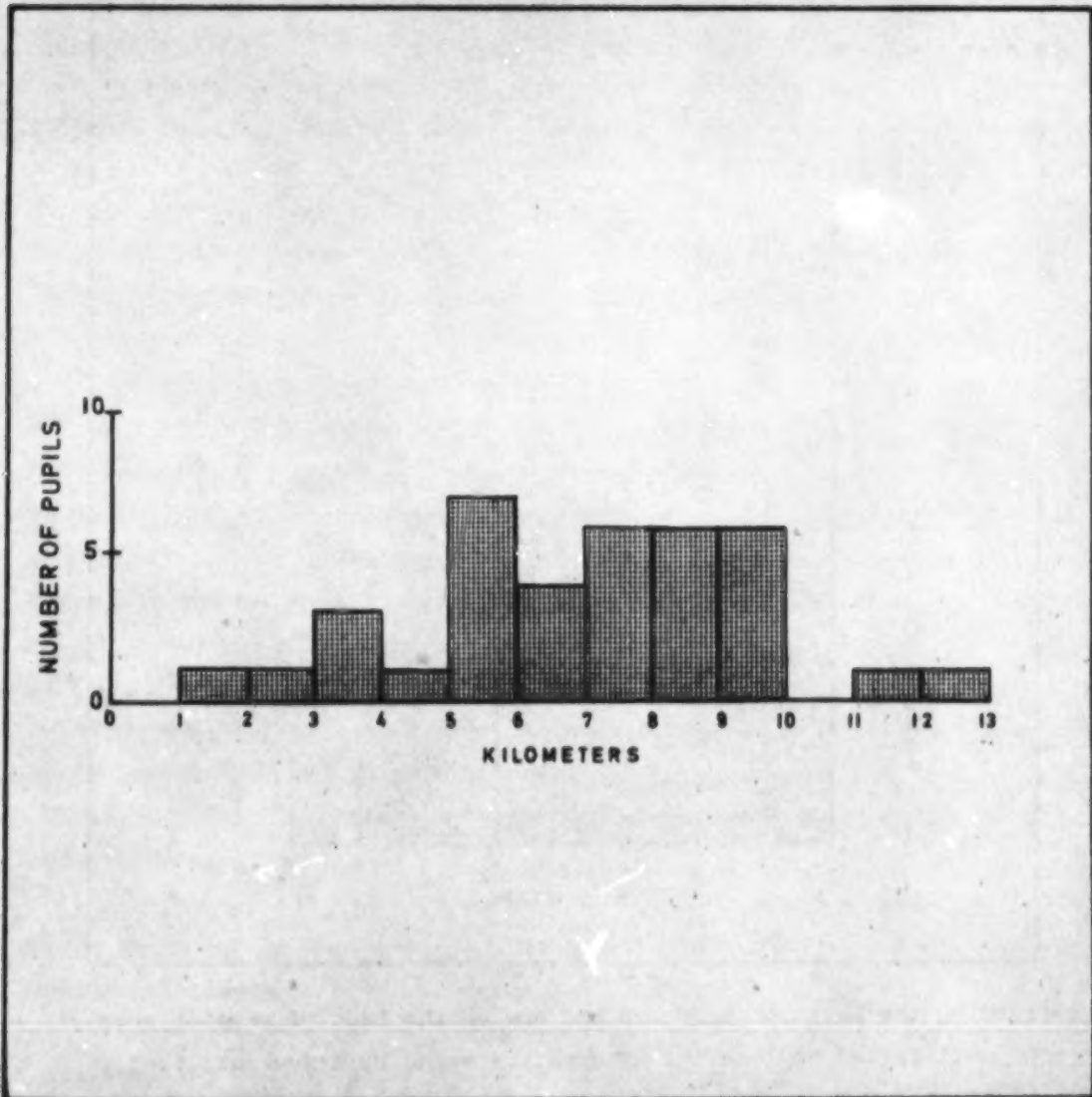
Figure 2. Distances travelled on foot (trading centre school). Pupils who have moved to temporary accommodations near the school are not included.



carried on the backs of bicycles and one on the back of a motor scooter (one pupil failed to list the alternative means of travel utilized).

Although Table 4 is useful in demonstrating the tremendous importance which the bicycle has for pupils at day secondary schools, it is impossible to determine from this data alone the extent to which the bicycle enables schools to draw pupils from a wider area than they otherwise could. In order to answer this question, exact information as to distance travelled needs to be obtained from pupils who utilize bicycles and compared with similar data from boys and girls who walk to school. Figures 2 and 3 show the distances travelled by pupils attending the

Figure 3. Distances travelled by bicycle (trading centre school). Pupils who have moved to temporary accommodations near the school are not included.



trading center school and residing at their fathers' homes. Pupils who travel to school on foot normally live within five kilometers of the school whereas those riding bicycles reside most often in the five to ten kilometer range. It can therefore be concluded that the bicycle is of fundamental importance in making it possible for a day secondary school to achieve a wide catchment area.

V. ESTIMATION OF ATTAINABLE CATCHMENT AREA SIZE

We have seen that the two day schools studied draw their pupils from over a wide area. But at the same time it is apparent that many pupils are able to attend schools which are distant from their homes only by employing special strategies. Thus, any attempt to draw conclusions regarding what catchment area size can be attained at government-aided day schools depends on the assumptions one makes as to which strategies will exist for pupils within a government-aided system.

Two considerations seem to be necessary when determining whether a strategy used by a pupil at a private day school would be acceptable in a day school system operated by the government. First, does the strategy entail any undesirable side effects? Second, is the strategy equally available to all pupils and all families or would some be at a disadvantage?

One strategy used by pupils at private day schools is to rent rooms. A specific disadvantage of relying on this strategy has already been touched upon in Section IV: most families do not wish daughters to live in unsupervised rented housing and if it were to be assumed that this is a viable method of achieving an adequate school enrolment girls would be discriminated against. Numerous other disadvantages of having pupils rent their own rooms could be mentioned, (1) and it seems unlikely that this method of obtaining adequate school enrolment would be used within the government supported system. If it were anticipated that pupils would have no choice but to rent accommodations, the argument would undoubtedly be raised that it would be far better for the educational authorities to see that supervised boarding facilities were available.

A second possible strategy is for pupils to live temporarily with relatives near the school they are attending. This response to the problem of distance may work very well in individual cases; however, it can hardly be used as the basis for planning an entire school system. It is most unlikely that every pupil who is not himself near a school will be fortunate enough to have a relative in the vicinity who is able to accommodate him.

(1) See S. G. Weeks, "Are Hostels Necessary? A Study of Senior Secondary Pupils in Greater Kampala" in Journal of Developing Areas, Vol. 1, No. 3, 1967, pp. 357-374.

The use of the bicycle is the third major strategy which makes it possible for private day schools to serve wide areas. This method of coping with the distance problem would appear to be well worth considering for possible incorporation into a system of government-aided day schools.

In many parts of Africa the use of the bicycle is the villager's standard method of dealing with a variety of situations which occur in his daily life. The bicycle is utilized for travel to distant shops, for visits to relatives in other villages and when one wishes to attend cultural, religious or political events at the county headquarters or other central locality. A man who works outside his home village uses a bicycle to reach his place of employment, and a person who becomes ill will be carried on the back of a bicycle to the nearest dispensary. Bicycles are important not only for transporting people but also for transporting commodities. Most frequently bicycles are used when agricultural products are being taken to markets or to the warehouses where cash crops are purchased by the government. Other items which may be carried by bicycle include wooden doors for houses, wicker cages full of chickens and high stacks of firewood.

Given the great variety of situations in which bicycles are utilized it is not surprising that many of the pupils at the two schools which were surveyed employ bicycles in order to attend schools which are distant from their homes. And one would expect that any new programs designed to make use of bicycles to increase schools' catchment areas would meet with the understanding of villagers.

Certainly it cannot be assumed that every family will have a bicycle which can be made available to a son or daughter attending secondary school. In fact, in poorer regions bicycles may be quite rare. Programs would therefore have to be established for assisting pupils who required bicycles, and considerable thought would have to be given as to how such programs could be organized in detail. But one point seems clear: even if a government were to bear the full cost of giving every pupil a bicycle, the final expense would be less than that of operating schools as boarding institutions.

Because bicycles are an accepted African solution to rural transportation problems and because bicycles are not overly expensive, a reasonable method of calculating the maximum catchment area attainable for a day secondary school is to use a range figure based on the distance which a pupil is able to travel by bicycle. 26

VI. CONCLUSION

We have considered the strategies of pupils at private secondary schools in order to obtain information relevant to the question of how catchment areas can be achieved which are sufficiently large to provide an adequate number of pupils for operating secondary schools as day institutions. One such strategy - the use of bicycles - has been shown to merit particularly close attention. How does this conclusion based on research in eastern Uganda compare with alternative methods for increasing catchment area size which might be proposed?

As was mentioned at the outset of this report, a study by Gould postulates five kilometers as the maximum distance which a secondary school pupil can travel under normal conditions. Since even in densely populated rural areas there will not be an adequate number of pupils within this range, Gould proposes that each school should have a bus to carry pupils from and to their homes.

It is certainly true that in many parts of the world the bus - be it school owned or part of the regular public transportation network - has enabled educational institutions to extend services beyond the limited local area. What is open to question, however, is whether the bus is in every case the most appropriate method for increasing the size of a school's catchment area.

One disadvantage of the bus is its cost. In addition to the huge initial investment required, there are also fixed operating expenses which are sizable: the salary of the driver, insurance premiums, fees for registration, and the costs for petrol and normal servicing. Finally, expensive major repairs will be necessary from time to time.

Not only are the costs of introducing buses high, but they are of such a nature that they entail both an immediate and long term depletion of a nation's foreign exchange resources. The bus will be purchased from a foreign firm and for as long as it is running it will require petrol from abroad as well as imported spare parts and repair shops furnished with equipment from abroad.

The situation with the bicycle is quite different. Possibilities for local manufacture are far better than they are for the bus. No imported fuel is required, and village bicycle mechanics using simple tools

can perform virtually all repairs, in many cases even welding. In addition, the initial cost per pupil is less. For the price of a single bus, one thousand bicycles can be purchased. Thus, even without considering the operating cost of the bus, it is possible to supply every pupil entering secondary school with a new bicycle for a period of twelve years before reaching the same level of expenditure which one would have with the bus(1). In actual practice, the balance in favor of the bicycle would be even higher since pupils living close to a school would not require bicycles. Also, it might be expected that pupils would return their bicycles after completing their four years at school or, alternatively, contribute part of the original purchase price.

A final consideration when comparing the relative merits of buses and bicycles should not be overlooked. At present the bicycle is in many areas the accepted means of dealing with local transportation problems and a healthy African villager who owns a bicycle might well laugh at the suggestion of using a bus to travel a distance of seven or eight kilometers. Under the circumstances, if buses are introduced as the ideal means of transporting school children certain contradictions may arise. For example, a pupil may be picked up at his home village and taken by bus to his school; at the same time his father, a trader at the market adjacent to the school, may travel the same distance daily by bicycle. A pupil living six kilometers from the school may travel this distance by bus while being educated; later, employed as an agricultural assistant, he may frequently be required to undertake travel over comparable distances. Yet now there is no bus available and his employer issues him not with a motor vehicle but with a bicycle.

Unless there are unexpected developments, population densities and enrolment ratios will not be such during the next few decades that government-aided day secondary schools can exist if pupils travel only on foot and do not seek temporary residence near their schools. Day schools do become feasible, however, if transportation aids such as bicycles and buses are introduced. It had been suggested by President Nyerere that Self-Reliance is a basic concept in African education, and with regard to this factor the bicycle would appear to have an advantage over the bus. At the

(1) In making these calculations it is assumed that a school will have two streams, i.e. an annual intake of eighty pupils.

national level, buses do not promote Self-Reliance because they entail a long-term commitment to imported machinery and fuel. In rural communities the Self-Reliance and independence which is achieved through the use of bicycles could needlessly be undermined by the introduction of buses to deal with situations in which the villagers themselves would consider the bicycle to be a suitable solution.

Far from being the ideal method for increasing the catchment area of a school, the bus must be regarded as a last resort to be adopted when low population densities make small scale technologies unsatisfactory.

APPENDIX

LOCATION OF PRIMARY SCHOOLS WHICH PUPILS ATTENDED
(percentages)

		School-County	4 Nearby Counties	Other Busoga	Non-Busoga
<u>Trading Center School, Boys (N=108)</u>					
Column	-	a. (5 km):	6.5	-	-
Subdivisions		b. (8 km):	8.3		
		c. (12 km):	8.3		
		d. (13 km):	6.5		
Total	58.3		29.6	8.3	3.7
<u>Trading Center School, Girls (N=61)</u>					
Column	-	a. (5 km):	6.6	-	-
Subdivisions		b. (8 km):	6.6		
		c. (12 km):	9.8		
		d. (13 km):	0.0		
Total	63.9		23.0	8.2	4.9
<u>Town School, Boys (N=146)</u>					
Column	-	a. (7 km):	17.1	-	-
Subdivisions		b. (7 km):	11.0		
		c. (8 km):	7.5		
		d. (9 km):	8.2		
Total	36.3		43.8	17.8	2.1
<u>Town School, Girls (N=55)</u>					
Column	-	a. (7 km):	10.9	-	-
Subdivisions		b. (7 km):	7.3		
		c. (8 km):	12.7		
		d. (9 km):	5.5		
Total	50.9		36.4	7.3	5.5